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Cross-cultural comparison of a French Canadian and U.S. developmental screening test

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The psychometric properties of the Ages & Stages Questionnaires (ASQ) (Bricker & Squires, 1999) used in a French-Canadian preschool population were compared with psychometric data derived from U.S. normative studies. The ASQ was translated into French (Bonin, Robaey, Vandaele, Bastin, & Lacroix, 2000) and used in four early childhood day care centers, with children ages 4-60 months. The psychometric properties of the French version are presented at the 42, 48, 54, and 60 - month ASQ intervals. Internal consistency varied across domains, from alpha of .24 for personal social domain at 60 months to .81 for communication at 48 months. Generally, the internal consistency properties, means, and standard deviations of the ASQ were similar in the French translation, but variations across US and French-Canadian populations were observed. The results are supportive of further development of the French version of the ASQ.

The importance of early identification and intervention for children with disabilities is clearly demonstrated (Bricker, 1989; Meisels & Shonkoff, 2000; Ramey & Ramey, 1998; Shonkoff & Phillips, 2000). In the U.S., the federal government has mandated specialized intervention services for preschool children with disabilities from 3-5 years, in Section 619 of Part B of the Individuals with Disabilities Education Act (IDEA), and has given states substantial financial incentives for developing comprehensive early intervention services for children with disabilities from birth through two years (i.e., Part C of IDEA). Coordinated child find and early identification systems for children with potential

developmental delays are included in the comprehensive system of service delivery detailed in IDEA.

In Quebec, the Health and Social Services Ministry has recognized the urgency for early intervention and prevention for children with developmental delays. However, governmental policy is not in place to assure systematic, formal and on-going screening of preschool children. Federally-funded childhood centers in Quebec were reorganized in 1997 as part of a new Family Policy Act, with screening for and prevention of disabilities included in the mission. However, no specific procedures or policies were included in the Act to assure that the screening takes place. Important educational policy guidelines (e.g., a philosophy that children are active participants in their learning and the importance of collaboration between parent and educator), requirements for training and certification, and fiscal guidelines assuring that the centers were available to all families in Quebec at a reasonable fee of \$7/day currently, were included in early childhood center guidelines (Gouvernement du Québec, Bill No. 8).

In addition to a lack of cohesive child find and screening procedures in Quebec, few developmental screening instruments are available in French in a province where the majority of families speak French in their homes (Bégin, 1992; Robert, 1995; Terrisse & Boutin, 1994). Therefore, the first requirement for early screening policy is the development of strategies and instruments that can be used in comprehensive child find protocol.

In the field of developmental screening, the Ages and Stages Questionnaires: A Parent-Completed Child Monitoring System (ASQ) (Bricker & Squires, 1999) presents many advantages as a foundational instrument in a comprehensive child find system. Specifically, it takes little time to complete, it is simply-worded, requires little training for administration, and is cost-effective and parent-friendly (Chan & Taylor, 1998; Dobrez et al., 2001). Because of these advantages, several pediatric groups in the U.S. (American Academy of Pediatrics, 2001; Printz, Borg, & Demaree, 2003; Wiseman, 2004) have recommended the ASQ as a valid and reliable instrument for practitioners and parents to use in the

developmental screening process. In cross-cultural applications, the ASQ has been used successfully in Australia (Skellern, Rogers, & O'Callaghan, 2001) and in Norway (Janson & Squires, 2004). It was translated into French (Bonin et al., 2000), but no psychometric studies have been completed to date. Therefore, this study was conducted to investigate the psychometric properties of the French translation of the ASQ when it is used in Quebec. Specifically, this study addressed the following questions:

- What is the internal consistency of the French-Canadian ASQ at the 42-60 month intervals?
- What are the screening cutoff scores (i.e., two standard deviations below the mean scores in each domain) of the French-Canadian ASQ?
- How do the screening cutoff scores compare with U.S. normative cutoff scores?
- Do early childhood daycare center providers in Quebec feel comfortable using the ASQ, and does it inform their practice with young children?

Method

Participants

Early childhood educators. A total of 68 educators at four sites - 48 from two Childcare Centers and 20 from two Educational Childcare programs in home settings participated in this study. The educators from the two Childcare Centers were college graduates, with 600 hours of general studies and 1830 hours of child development studies completed in their coursework. The educators from the Educational Childcare home-based programs had no specific training but were supervised and accredited by an umbrella organization for childcare centers. The home childcare educators had 45 hours of child development training as part of their supervision/accreditation.

Children. The educators at these centers and programs completed 416 ASQ questionnaires on 285 children. The number of questionnaires

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collected for the 42, 48, 54 and 60 months intervals can be found in Table 1. Of the 285 children, 51% ($n = 146$) were male, and 49% ($n = 139$) were female. Demographic information was collected from all parents. Some chose not to respond to all questions resulting in some missing data. The level of education for the mothers was: 25.3% had completed either secondary or elementary education; 41.3% graduated from or had some college education; and 33.3% had partial university or were university graduates. For the fathers, the corresponding percentages are 43.1 secondary or less; 39.3 partial college or college graduate; and 17.7 partial university or university graduate.

Table 1
Number of questionnaires by Childcare Center

Questionnaires	Childcare Center 1	Childcare Center 2	Childcare Center 3	Childcare Center 4	Total
42 months	47	13	13	31	104
48 months	44	29	29	24	126
54 months	33	26	23	22	104
60 months	32	13	19	18	82
Total	156	81	84	95	416

Family annual incomes are as follows: 5% have less than \$10,000 (CAN), 12.5% earn between \$10,001 and \$20,000, 11.8% earn between \$20,001 and \$25,000; 21.7% earn more than \$25,000, and 49.1% earn more than \$40,000. Except for 5 children (1 Native Canadian, 1 Black, 1 Latino-American, 1 German and 1 Italian), the remainder were Canadians of White European descent. French was spoken exclusively in 159 households; French and English in three households; and English only was spoken in two households.

Measures

Ages & Stages Questionnaires. The ASQ consists of 19 questionnaire intervals spanning from 4 months to 5.5 years of age. Each interval contains 30 simply-worded questions that can be completed by familiar caregivers in approximately 10 minutes. Developmental domains include fine motor, gross motor, communication, problem solving, and

personal social. Caregivers answers "yes," "sometimes, and "not yet " according to whether children can do activities such as:

- "When drawing, does your child hold a pencil, crayon, or pen between her fingers and thumb like an adult does?" (42-month ASQ)
- "Does your child use endings of words, such as "s", "ed", and "ing"?" (48- month ASQ)

Psychometric properties of the U.S. version were studied with over 8,000 questionnaires (Squires, Potter & Bricker, 1999). Data has been reported on concurrent validity, test-retest reliability, and inter-rater reliability. Test-retest reliability, or comparison of scores of two questionnaires completed by a caregiver ($n = 175$) at a two-week interval was 94%. Inter-observer reliability, or comparison of children's classifications based on questionnaires completed by parents ($n = 112$) and professional examiners ($n = 2$) was also 94%. Concurrent validity, reported as percent agreement between classification of being at risk on the ASQ and standardized assessments, ranged from 76% for the 4-month ASQ to 91% for the 36 month ASQ. Overall agreement was 88%. Sensitivity (the ability of the ASQ to detect delayed development) ranged from 51% for the 4-month ASQ to 90% for the 36-month ASQ. Overall sensitivity was 76%. Specificity, or the ability of the ASQ to identify correctly typically developing children, ranged from 81% for the 16-month ASQ to 92% for the 36-month ASQ, with an overall specificity rate of 86%.

Assessment of the French ASQ. A survey instrument was developed for use with educators in Childcare Centers in Quebec (Dionne, 2002) to measure early childhood educators' perceptions regarding administration and use of the ASQ. This 13-item Likert scale with three choices of response - yes, sometimes, and no, included items such as "Little time is needed for ASQ administration;" "it is easy to understand;" "it is easy to use;" "it is helpful for collaboration with other partners."

Focus groups. Five groups were formed. Each group included eight participants. Three questions were discussed in focus groups: 1) the

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compatibility of the ASQ with educational program in the center; 2) the educators' experience with the ASQ administration; and 3) their recommendations for using the assessment in educational centers.

Parent Demographic Questionnaire. A demographic questionnaire was sent to parents asking for information on ethnicity, income level, and language spoken in the home. It was accompanied by a consent form from the Childcare Centers and researchers.

Procedures

Childcare Centers in Quebec were chosen as target sites for this research because they were the most promising sites for implementation of a formal and ongoing system for early screening of preschool children for developmental delays. Four Childcare Centers participated. Childcare staff attended a training session on the administration of the ASQ. After training, the staff presented the research project to prospective parents and requested consent to use the ASQ with their child. After parents agreed and signed informed consents, the list of children with their birth dates was sent to researchers. The appropriate ASQ questionnaire matching the age of the child was then returned to participating educators. The educator completed a first ASQ immediately after receiving the age-appropriate questionnaire, and a second ASQ in 4 months or less to measure test-retest reliability. After the administration of the second ASQ, the staff were invited to participate in focus groups to discuss the ASQ and its administration.

Results

Cronbach's alpha and correlations

Cronbach's alphas and correlations were computed on the 42-60 month intervals of the ASQs. The internal consistency of these four ASQ intervals ($n=416$) was determined by calculating Pearson product moment correlations between area and overall scores for each. Comparisons with the comparable U.S. data are presented.

As shown in Table 2, for the 42 month questionnaire for Quebec population alphas ranged from .56 to .69 with the exception of .33 for the gross motor domain. For 48 months questionnaire alphas ranged from .67 to .81, with the exception of .40 for the personal social domain. For the 54 month questionnaire, alphas ranged from .55 to .71. At 60 months, alphas ranged from .49 to .70, except for a .24 alpha for the personal social domain.

Table 2
Standardized Alphas by Area and Age Interval for Quebec and U.S. Populations

Age interval (in months)	Communication		Gross motor		Fine motor		Problem solving		Personal social	
	QC	US	QC	US	QC	US	QC	US	QC	US
42 ^a	.59	---	.33	---	.70	---	.69	---	.56	---
48	.81	.79	.69	.84	.67	.86	.70	.85	.40	.86
54 ^a	.64	---	.68	---	.71	---	.66	---	.55	---
60	.68	.79	.49	.75	.70	.76	.67	.77	.24	.77

^a Cronbach's alpha not reported for these intervals in US data.

Correlations between domains and overall scores are reported in Table 3. For the 42 month questionnaire the correlations ranged from .56 to .76. For the 48 month questionnaire, the correlations ranged from .62 to .84. For the 54 month questionnaire the correlations ranged from .74 to .83, and at 60 months, the correlations ranged from .62 to .81.

Table 3
Correlations between Domains and Overall Score for Quebec and U.S. Populations

Age interval (in months)	N	Communication		Gross motor		Fine motor		Problem solving		Personal social	
		QC	US	QC	US	QC	US	QC	US	QC	US
42 months ^a	104	.71	---	.56	---	.64	---	.76	---	.69	---
48 months	126	.84	.73	.62	.69	.77	.82	.79	.66	.65	.75
54 months ^a	104	.74	---	.79	---	.83	---	.75	---	.76	---
60 months	82	.74	.44	.62	.58	.81	.55	.76	.55	.62	.48

^a Correlations not reported for these intervals in US data.

Determination of screening cutoff points

The method used for calculating referral cutoff points was the same procedure used with the U.S. normative study (Squires et al., 1999). Two

standard deviations were subtracted from the mean score of each domain. Table 4 presents means, standard deviations and cutoff points by questionnaire for each developmental area, comparing the Quebec and U.S. populations. Out of 20 comparisons in Table 4, 12 were statistically significant. However, of these only 3 have a raw score difference of 5, which is the smallest scoring increment (5 = sometimes response) on the ASQ. The Quebec cutoff is lower on the communication, fine motor and problem solving domain and higher only on the personal social domain.

Table 4
Comparison of Quebec and US and International Cutoff Points and Means for ASQ Domain Scores

Age	Sample	N	Communication			Gross motor		
			M	SD	CP	M	SD	CP
42	QC	104	51.39	9.77	31.85	53.99*	7.42	39.15
	IN ^a	110	52.00	7.00	38.00	56.00	5.50	45.00
48	QC	126	51.23***	13.10	24.95	54.52**	9.39	35.74
	US ^b	336	55.90	8.50	39.10	51.90	9.60	32.09
54	QC	104	54.57***	8.59	37.38	56.73	6.96	42.81
	IN ^a	105	58.00	4.00	50.00	56.50	7.00	42.50
60	QC	82	49.63	10.30	29.09	51.40	8.72	33.96
	US ^b	125	49.90	9.10	31.70	52.20	9.80	32.70

Table 4 (cont'd)

Fine motor			Problem solving			Personal Social		
M	SD	CP	M	SD	CP	M	SD	CP
53.13	10.3	32.45	53.56	9.85	33.86	55.82	6.12	43.58
53.00	6.50	40.00	54.00	7.50	39.00	54.50	6.00	42.50
50.00***	11.8	26.48	50.95***	11.6	27.73	53.61***	6.50	40.61
43.50	14.3	30.00	56.7	18.1	35.00	48.60	12.60	23.40
49.18***	11.7	25.70	49.04*	11.8	25.38		7.30	40.11
44.50	9.00	26.50	52.00	9.50	33.00	54.71***	7.00	36.50
						50.50		
47.20*	12.6	22.06	47.56**	11.1	25.38	55.24	5.44	44.36
51.10	10.3	30.50	51.40	10.6	30.10	54.00	7.30	39.50

^a American and Norwegian population sample

^b American population sample

* p < .05. **p < .01. ***p < .001.

For the 42 month questionnaire the cutoffs for the Quebec population are lower than for the U.S. population on communication, gross motor, fine motor and problem solving areas, suggesting that the French-Canadian population was performing fewer items than the U.S. population. The difference was largest for the communication (6.15 points) and fine motor (7.55 points) areas. The only domain in which cutoffs are higher is personal social domain, with a difference of 1.08.

For the 48 month questionnaire the cutoff scores for communication, fine motor and problem solving domains are lower for the Quebec population. For communication, the difference is large (14.15). However, the cutoff scores for gross motor, personal and social domains are higher for the Quebec population, with differences ranging from 3.65 to 17.21 respectively.

On the 54 month questionnaire, the cut-off scores for communication, fine motor, and problem solving were lower for the Quebec population, with the largest difference in the communication domain (12.52). Only the personal social domain had a cut-off score higher for the Quebec population. Finally, on the 60 month questionnaire, the cut-off scores were similar. The cutoff scores for the Quebec population were lower for 3 domains, especially for fine motor domains. In gross motor and personal social areas, the cut-off scores were higher.

Utility Questionnaire

Results from the utility questionnaire were summarized for 41 early childhood educators. If "yes" and "sometimes" responses are compared, 3 items have 100% agreement. For all educators ASQ is easy to understand, easy to use and give helpful information about child development. More than 95% of 41 educators found the ASQ a) to require reasonable time to administer, b) calculating results is easy and c) it is helpful to identify domains in which children have needs and for better collaboration with other partners.

Focus groups

The most frequent comments focused on the ability of the ASQ to be used easily as a basis for discussion of a child's development, and on how the ASQ stimulated collaboration with parents. Second, the compatibility of ASQ with a play approach commonly used in the childcare programs was emphasized. A final theme was that ASQ helped to promote individualized intervention and monitor child development by center personnel. The most frequent comments related to using the ASQ were: the relatively short time needed to administer the measure, the appropriateness of ASQ as a basis for discussion and collaboration with parents. In addition, the ability of the ASQ to screen across developmental domains: including gross and fine motor problems, difficulties with social behaviors, social functioning, attention and concentration problems, and communication, was frequently mentioned. Recommendations included increasing the use of the ASQ in all Early Childhood Centers and other intervention services, and with all at risk children.

Discussion

The ASQ emerged as a very useful and informative tool for child-care staff, although its psychometric properties require further study. The internal consistency properties of the ASQ were similar for the U.S. and the French-Canadian versions in spite of some differences. Coefficient alphas measuring internal consistency (Table 2) were similar, but alphas were lower in some instances. These lower measures of internal consistency may well be due to the fact that only typically developing children were included in the French-Canadian population. This limited variability may have restricted the range of alphas.

Overall French-Canadian and U.S. cutoff points were similar. The differences were lower French-Canadian scores outside of the gross motor and personal social domain. Significant differences were observed, especially for the 48 month questionnaire in fine motor, problem resolving and personal social domain (>5 raw score). For the 12 cut-off scores with a statistically significant difference, 9 were higher for

the U.S. sample (suggesting higher skill level) and 3 were higher for the Quebec sample. The domains in which cutoff scores differed most between the two populations were in the communication and personal social areas. Differences in both these domains may be explained by differences in the cultures, such as varying expectations for when children complete dressing tasks independently. In addition, translation differences may have accounted for the questions being read and interpreted differently in the two populations.

There may be other issues at work, however, to explain the differences in scores between US and Quebec children. First the ASQ was completed by child care educators and not parents, as was the case in the studies of the US population. Child care educators and parents may see difference behaviors and also evaluate these behaviors differently. Second, while the impact of the culture needs to be considered, the low standardized alphas in gross motor are puzzling. One would expect motor behaviors in children to be affected less by cultural differences (therefore to have higher alphas) than behaviors in communication and personal social areas. To explain the differences in the internal consistency of the motor domains, problems or differences in the French translation perhaps should be examined.

Future research directions include increasing the sample sizes and including younger age intervals (4-46 months). Also, the results of this study need to be compared with results when parents complete the ASQ. Lower scores on some ASQ items may reflect French Canadian educators not being as familiar as parents with some child behaviors.

It is important to continue cross cultural research on assessments due to growing diversity in both the U.S. and Canadian populations. It will be important to investigate the use of the ASQ in a multi-ethnic context like Montreal. It will also be interesting to compare the psychometric properties of the ASQ with an English Canadian population. Continued research on low cost methods for identifying diverse children with developmental problems in a variety of cultures is of paramount importance in our multi-ethnic world. This kind of research is especially important because the educators in Childcare Centers in Quebec

consider the ASQ like a helpful tool for monitoring child development and screen developmental delays.

References

American Academy of Pediatrics. (2001). Developmental surveillance and screening of infants and young children. *Pediatrics*, 108(1), 192-6.

Bégin, D. (1992). *Pour commencer... L'intervention précoce auprès de l'enfant ayant une déficience et de sa famille*. Québec : Office des Personnes Handicapées du Québec.

Bonin, M., Robaey, P., Vandaele, S., Bastin, G. L., & Lacroix, V. (2000). *Questionnaire sur les étapes de développement: Évaluation de l'enfant par les parents* (2nd ed.). Baltimore : Paul H. Brookes Publishing Co.

Bricker, D. D. (1989). *Early intervention for at-risk and handicapped infants, toddlers, and preschool children*. Palo Alto, CA: VORT Corporation.

Bricker, D., & Squires, J. (1999). *Ages and stages questionnaire* (2nd ed.). Baltimore, MD: Paul H. Brookes.

Chan, B., & Taylor, N (1998). The Follow-Along Program Cost Analysis in Southwest Minnesota. *Infants and Young Children*, 10(4), 71-79.

Dionne, C. (2002). *Utilisation de l'outil de dépistage "Ages and Stages Questionnaires."* Document inédit, Université du Québec à Trois-Rivières.

Dobrez, A. L., Sasso, J., Holl, M., Shalowitz, S., L., & Budetti, P. (2001). Estimating the cost of developmental and behavioral screening of preschool children in general pediatric practice. *Pediatrics*, October 1, 108(4), 913-922.

Gouvernement du Québec (2003). *Projet de loi numéro 8, chapitre 13 : Loi modifiant la loi sur les centres de la petite enfance et autres services de garde à l'enfance [Bill No. 8 the new Act to amend the Act respecting childcare centers and childcare services as regards places giving entitlement to grants]*. Québec : Éditeur officiel du Québec.

Janson, H., & Squires, J. (2004). Parent-completed developmental screening in a Norwegian population sample: A comparison with U.S. normative data. *Acta Paediatrica*, 93(11), 1525-1529.

Meisels, S. J., & Shonkoff, J. P. (2000). Early childhood intervention: A continuing evolution. In J. P. Shonkoff, & S. J. Meisels (Eds.),

Handbook of early childhood intervention (pp. 3-31). Cambridge, UK : Cambridge University Press.

Printz, P. H., Borg, A., & Demaree, M. A. (2003). *A look at social, emotional, and behavioral screening tools for Head Start and Early Head Start*. Newton, MA: Education Development Center, Inc.

Ramey, C. T., & Ramey, S. L. (1998). Early intervention and early experience. *American Psychologist*, 53, 109-120.

Robert, J.-P. (1995). *Recherche évaluative sur le «Programme de prévention et de dépistage en santé globale auprès des enfants de 0-5 ans et de leurs parents.»* Ville-Marie: Centre de santé Sainte-Famille.

Skellern, C., Rogers, Y., & O'Callaghan, M. (2001). A parent-completed developmental questionnaire: Follow-up of ex-premature infants. *Journal of Paediatrics & Child Health*, 37(2), 125-129.

Shonkoff, J. P., & Phillips, D. A. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development* (2nd ed.). Washington, D.C.: National Academy Press.

Squires, J., Potter, L., & Bricker, D. (1999). *The ASQ User's Guide for the Ages and Stages Questionnaires: A Parent-Completed, Child-Monitoring System, 2nd edition*. Baltimore: Paul H. Brookes Publishing Co.

Terrisse, B., & Boutin, G. (1994). *La famille et l'éducation de l'enfant*. Montréal : Editions Logiques.

Wiseman, A. W. (2004). The American Educational Experience in an International Cultural Context. Multicultural Course Development Grant, The University of Tulsa, Office of the Provost. \$3,000 (funded)

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